

REMARKS

The application has been amended and is believed to be in condition for allowance.

Previously, claims 1-9 were pending with claim 1 being independent. This amendment cancels claims 2-4 and 7-9.

The subject matter of claims 2-4 has been incorporated into claim 1. Further, the nature of the tensile test piece has also been incorporated into claim 1.

In view of the claims having been canceled, there are no formal matters outstanding.

The previously pending claims were rejected as obvious over MASUYAMA et al. 4,799,972.

The Official Action rejected claim 1 for the following reasons:

(1) The chemical composition of the steel pipe in this invention overlaps with the steel composition disclosed in MASUYAMA et al., and

(2) The steel disclosed in MASUYAMA et al. satisfies $TS \cdot (E_l + 21.9) \geq 25000$ (MPa·%).

However, applicants believe that this argument is not viable as E_l varies with the size of the tensile test piece. Therefore, claim 1 has been amended to remedy this problem by identifying the test piece size.

The tensile test piece of this invention has a cross-section with a width of 19 mm and a thickness of 2 mm and has a gauge length of 50 mm (JIS No. 12 test piece, specification pages 9 and 14), whereas the tensile test piece in MASUYAMA et al. is a round bar with a diameter of 6 mm and a gauge length of 30 mm (see column 7, line 29). El is $\Delta L/L \times 100\%$ wherein ΔL is elongation and L is gauge length. ΔL is not affected by the gauge length. If ΔL is 6 mm, El is $6/30 \times 100\% = 20\%$ for a gauge length of 30 mm, and El is $6/50 \times 100\% = 12\%$ for a gauge length of 50 mm. Thus, El decreases in reverse proportion to the gauge length for the same elongation ΔL of 6 mm.

Although the conversion of El between different sizes of test pieces is affected by the cross-sectional area, the n-value, and the Lankford value, the El for the size of the test piece in this invention is about 3/5 of that for the size of the test piece in MASUYAMA et al. Thus, according to the size of the test piece recited in claim 1 of this invention, the El of the material disclosed in MASUYAMA et al. does not satisfy $TS \cdot (El + 21.9) \geq 25000 \text{ (MPa} \cdot \%)$.

The Official Action concluded that the Lankford values and the diameters of ferrite grains would be the same as long as the chemical compositions and the tensile strengths are the same. As described above, however, El of the stainless steel pipe of this invention is larger than El of the steel in MASUYAMA et al.;

hence, the diameter of ferrite grain of the steel of this invention is also larger than the diameter of ferrite grain of the steel in MASUYAMA et al. MASUYAMA et al. do not disclose a diameter of ferrite grain of 8 μm or more and an area ratio of martensite of 30% or less.

The Official Action concluded that MASUYAMA et al. disclose heat-refining treatment. Furthermore, the Official Action concluded that application of the boiler steel pipe to the automobile field was obvious.

Applicants disagree. In general, the boiler steel pipe exhibits poor formability in exchange for improved high-temperature creep characteristics. In detail, large amounts of Nb and V, which precipitate carbides, are added in order to enhance high-temperature strength. The carbides of Nb and V readily cause cracking of the steel pipe during deformation of the pipe and significantly decrease formability. The boiler steel pipe disclosed in MASUYAMA et al. cannot be subjected to such large deformation that is achieved by the steel pipe of this invention. Therefore, there is no application to the automotive field.

As described above, the steel pipe of this invention exhibits superior formability that cannot be achieved by the steel disclosed in MASUYAMA et al., and thus this steel pipe is

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significantly useful in the automobile field of industry and non-obvious over MASUYAMA et al.

In summary, for the above-noted reasons, the presently pending claims are believed to be non-obvious over the applied art. Therefore, reconsideration and allowance of all the pending claims are respectfully requested.

Applicants believe the present application is in condition for allowance and an early indication of the same is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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